microlife

MICROLIFE® CARDIO+

Blood Pressure Monitor

For accurate blood pressure measurement

Instruction Manual

Dear Customer,

We thank you for purchasing the Microlife® Cardio+, the blood pressure monitor that allows you to easily and accurately measure your blood pressure.

The Microlife Cardio+ Blood Pressure Monitor is a reliable medical device designed for use with your iPhone, iPad, or iPod touch. This simple-to-use, accurate monitor comes highly recommended for blood pressure monitoring at home. Developed in collaboration with physicians, the Microlife Cardio+ has been clinically tested to ensure the highest accuracy of its measurements.*

Read through these instructions carefully to understand this product's functions and safety information. We want you to be happy with your Microlife product.

If you have any inquiries, contact Microlife's customer support center.

Your retailer or pharmacy can provide you with the contact information of the Microlife dealer in your country. Or visit www.microlife.com for more information about our products.

Stay healthy!

Microlife AG

** This device uses the same measuring technology as the award winning «BP 3BTO-A» model tested according to the British Hypertension Society (BHS) protocol.*

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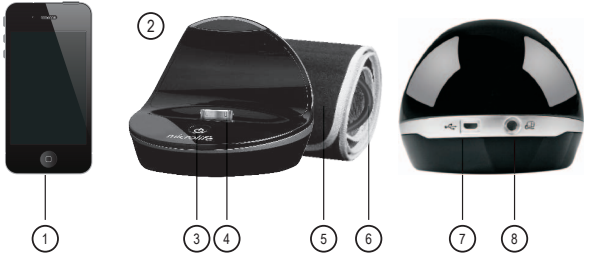
Product Overview

Microlife Cardio+ Blood Pressure Monitor and Application



1) Connection Slot on iPhone/iPad/iPod touch
2) Microlife Cardio+ Dock
3) On/Off Button
   Cancel Button (during measurement)
4) Microlife Cardio+ Plug
5) Preformed Cuff
6) Air Hose
7) Micro USB Port
8) Air Hose Socket

9) Measurement
10) Report
11) Settings
12) Users

What is included:

- Microlife Cardio+ Dock x 1
- Preformed Cuff, Size M–L (22–42 cm) x 1
- USB Cable for Charging Battery x 1
- Carrying Case x 1
- Instruction Manual x 1
- Quick Start Guide x 1

Read the instructions carefully before using this device.

Type BF applied part.

Before Using the Microlife Cardio+ for the First Time

Charging the Microlife Cardio+ Blood Pressure Monitor

- Connect the dock to an iOS-device USB power adapter using the supplied USB cable. Connect to a power outlet and charge the dock for 2 hours.
- During the charging process, the « ⏻ » button lights up in yellow. When the battery is completely charged, the « ⏻ » button lights up briefly in blue, and then the unit automatically switches off.

While Charging
Start button lights up in **yellow**

When Charged
Start button lights up briefly in **blue** and the unit switches off

- The battery status of the blood pressure monitor is displayed at the bottom of the Microlife Cardio+ app screen.
- While charging the Microlife Cardio+ Blood Pressure Monitor, you can also charge your iOS device.

⚠ Charging the Microlife Cardio+ Blood Pressure Monitor directly through a computer USB port is not recommended.

Downloading the Microlife Cardio+ App from the App Store

Go to the App Store and search for «Microlife Cardio+». Once this app has been downloaded, the icon will appear on your iOS device.

☞ To download the app, you need an Apple ID with an email address and password, as well as an active Internet connection. While the Microlife Cardio+ app is free to download, you may be subject to charges from your Internet provider for using the Internet to do so.

Creating a User Profile (optional)

If more than one person will use the monitor, create a user profile to ensure that each user's data is stored separately. Open , and go to «User» to create a profile.

Setting a Blood Pressure Target (optional)

If targeted measurement values have been recommended by a doctor, set a blood pressure target to give a realistic reading based on these recommendations. Open , and go to «Settings». Set and save the «Systolic» and «Diastolic» targets.

After completing these steps, you are ready to take a blood pressure measurement.

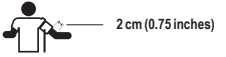
Note: Confirm that the time and date on your iOS device are correct.

Taking Measurements with the Microlife Cardio+

Before Taking a Measurement

- Avoid any activity, eating, or smoking immediately before taking a measurement.
- Sit down and relax for at least 5 minutes before taking a measurement.

- Always take measurements on the same arm (normally the left).
- Remove close-fitting clothing from the upper arm. To avoid constriction, your shirt sleeve should not be rolled up; it will not interfere with the cuff if it is laid flat.
- Fit the cuff closely, but not too tightly. Make sure that the cuff is 2 cm (0.75 inches) above your elbow, with the tube on the inside of your arm.



- Support your arm so that it is relaxed. Ensure that the cuff is at the same height as your heart.

Taking a Measurement

- Open the «Microlife Cardio+» app automatically by plugging the iOS device to the monitor dock. Alternatively, click on the app displayed on the iOS device screen.
- Select the measurement mode: ONE measurement (single), or MAM measurement (triple).
- Press «Start» to begin.
- Press «Stop» to cancel anytime during the measurement (e.g., if you feel uncomfortable because of the pressure from cuff). You can cancel the measurement through the Apple device interface or the blood pressure monitor itself.

☞ **What Is MAM Measurement?**
MAM stands for «Microlife Average Mode». It is a Microlife proprietary patented technology that takes and analyzes your blood pressure in 3 successive measurements, automatically. Since blood pressure constantly fluctuates, a result determined with MAM is more reliable than a result obtained from a single measurement. This type of measurement is also recommended by doctors in most of the medical guidelines for hypertension management.

During Measurement

- The cuff will pump up automatically. Do not move or talk, and do not tense your arm muscles. Breathe normally.

- When the correct pressure is reached, the pumping stops and the pressure decreases gradually.
- The heart symbol flashes in the display every time a heartbeat is detected.
- If you choose MAM measurement, 3 measurements are taken in succession, with 15-second intervals between each one. A fourth measurement will be taken if any of the results are unclear.

☞ During the measurement process, if you receive a phone call or detach the iOS device from the dock, the cuff will automatically deflate and stop the whole measurement process.

Completed Measurement

- After the results are shown, the measurement is complete.
- Your systolic and diastolic blood pressure and your pulse are displayed in the results.
- Remove the cuff and save the measurement results.

Interpreting the Measurement Results

WHO Indicator

The color of the «WHO» icon indicates the results of your measurement. To check the evaluation of the measurement, press the «WHO» icon.

The higher value is used in this evaluation, even if the other value is normal.

Example: 150/85 mmHg indicates «Blood pressure too high».
120/98 mmHg indicates «Blood pressure too high».

Pulse Arrhythmia Detection (PAD) Indicator

The «PAD» symbol indicates that certain pulse irregularities were detected during the measurement:

- If the result deviates from your normal blood pressure, repeat the measurement.
- If this symbol appears on a regular basis (e.g., several times a week when measurements are taken daily), we advise you to inform your doctor and show the following explanation.

☞ **Early Detection of Pulse Arrhythmia**
This device is an oscillometric blood pressure monitor that also analyzes pulse rate during measurement. Although it does not replace a cardiac examination, this device has been clinically tested and can detect pulse irregularities at an early stage.

The «PAD» symbol is displayed if pulse irregularities have been detected. If this symbol appears frequently, we recommend that the patient seek medical advice.

Classification of Adult's Blood Pressure Values in Accordance with the World Health Organization (WHO) in 2003.

	Range	Systolic (mmHg)	Diastolic (mmHg)	Recommendation
	Blood pressure too low	⬇100	⬇60	Consult your doctor
1	Blood pressure optimum	100–120	60–80	Self-check
2	Blood pressure normal	120–130	80–85	Self-check
3	Blood pressure slightly high	130–140	85–90	Consult your doctor
4	Blood pressure too high	140–160	90–100	Seek medical advice
5	Blood pressure far too high	160–180	100–110	Seek medical advice
6	Blood pressure dangerously high	⬆180	⬆110	Urgently seek medical advice

Managing the Measurement Data

Saving Data

- Press «Save» to store the measurement results, including measurement mode, date, and time. If you do not wish to keep a measurement, press «Cancel».
- To store measurement results from other blood pressure devices, go to «Manual Input».

☞ The amount of data saved depends on the memory capacity of your iOS device. A warning message will appear when the memory is full. Delete old data to save new data.

Deleting Data

- Delete Individual Data: Go to «Report» and press «Edit».
- Delete All Data: Go to «Settings» and press «Reset Data».

Viewing Data

Go to «Report» to view data.

- Viewing Individual Data: Swipe the screen vertically to see data taken in the same month. To view data taken in different months, swipe the screen horizontally.
- Viewing Data in a Line Graph: Turn the iOS device horizontally. To view data in a specific timeline, choose the intended period of view.
- Viewing Data in a Bar Chart*: Turn the iOS device and swipe the screen horizontally. To view data in a specific timeline, choose the intended period of view.

1D – One day 1W – One week	1M – One month 3M – Three months	1Y – One year All – All measurements stored

Sharing Data

Go to «Report» and press «✉» to share data*.

*Data is shared via email in CSV format. To use this function, an email account must be set up in your iOS device and an Internet connection is needed.

Managing a User Profile

Creating a User Profile

Creating a profile for an individual user ensures that each individual's data is stored separately. Go to «User» and choose «+» to create a new user. Up to 10 profiles can be created.

Selecting a User Profile

Go to «User», select the user listed, and proceed to take a measurement.

Deleting a User Profile

Go to «User», click «Edit», and select the user to be deleted.

Appendix

Battery Power Indicators

The «⏻» button on the blood pressure monitor may show the following:

- No Light: The battery is completely charged.
- Blue Light: The battery is over 20% charged.
- Yellow Light: The battery is less than 20% charged. Charge the battery.
- Blue and Yellow Lights Flashing Alternately: The battery is defective.

⚠ Do not let the battery run down completely, as this shortens the battery's service life.

Error Messages

If an error occurs during the measurement, the measurement is interrupted and an error message, e.g., «ERR 3», is displayed.

Error	Description	Potential cause and remedy
«ERR 1»	**Signal too weak**	The pulse signals on the cuff are too weak. Re-position the cuff and repeat the measurement.*
«ERR 2»	**Arm movement**	During the measurement, error signals were detected by the cuff, caused, for instance, by movement or muscle tension. Repeat the measurement, keeping your arm still.
«ERR 3»	**No pressure in the cuff**	Adequate pressure cannot be generated in the cuff. A leak may have occurred. Check that the cuff is correctly connected and not too loose. Recharge the batteries if necessary. Repeat the measurement.
«ERR 5»	**Abnormal result**	The measuring signals are inaccurate and no result, therefore, can be displayed. Read through the checklist for performing reliable measurements and then repeat the measurement.*
«ERR 6»	**MAM mode error**	There were errors during the measurement in MAM mode, making it impossible to obtain a final result. Read through the checklist for performing reliable measurements and then repeat the measurement.*
	Low battery	The battery power in the Microlife Cardio+ Blood Pressure Monitor Dock is too low. Charge the dock before taking any measurements.

* Consult your doctor, if this or any other problem occurs repeatedly.

Facts about Blood Pressure and Self-Measurement

- Blood pressure is the pressure of the blood flowing in the arteries, generated by the pumping of the heart.
- Two values, the systolic (upper) value and the diastolic (lower) value, are always measured. This device also indicates pulse rate (the number of times the heart beats in a minute).
- Permanently high blood pressure can damage your health and must be treated by your doctor.
- Always discuss your results with your doctor if you have noticed anything unusual or feel unsure about the results. Never rely on a single blood pressure reading.
- Under no circumstances should you alter the dosages of any drugs prescribed by your doctor.
- Depending on physical exertion and other conditions, blood pressure is subject to wide fluctuations, especially as the day progresses. You should, therefore, take your measurements under the same conditions, when you are relaxed.
- Take at least two measurements per day - one in the morning and one in the evening.
- It is quite normal for two measurements taken in quick succession to produce significantly different results.
- Differences in measurements taken by your doctor or at the pharmacy and those taken at home are quite normal, as these environments are very different.

Safety and Protection

- This device and cuff have sensitive components and must be treated with care.
- Protect this device from:
  - water and moisture.
  - extreme temperatures.
  - damage from impact or drops.
  - contamination and dust.
  - direct sunlight.
  - heat and cold.

- Do not use the device if you think it is damaged or if you notice anything unusual about it.
- Never open the device.
- Use only the cuff provided.

Ensure that children do not use the device unsupervised; some parts are small enough to be swallowed.

Device care

Clean the device with a soft, dry cloth. Do not use gas, thinners or similar solvents.

Cleaning the Cuff

Spots on the cuff can be removed carefully with a damp cloth and soapsuds.

The cuff with bladder must not be washed in a dishwasher, clothes washer, or submerged in water.

Accuracy Test

We recommend that this device is tested for accuracy every 2 years or after any mechanical impact (e.g., being dropped). Contact Microlife's service center to arrange a test.

Batteries and electronic devices must be disposed of in accordance with the locally applicable regulations, not with domestic waste.

Guarantee

This device is covered by a **2-year guarantee** from the date of purchase. The guarantee is valid only on presentation of the guarantee card completed by the dealer (see back) confirming date of purchase or the receipt.

- Batteries, cuff, and normal wear and tear are not included.
- Opening or altering the device invalidates the guarantee.
- The guarantee does not cover damage caused by improper handling, discharged batteries, accidents, or non-compliance with the operating instructions.

Contact Microlife's customer service center for further details.

Technical Specifications

Product name:	Microlife® Cardio+ Blood Pressure Monitor BP4GAPO-2M
Runs on Apple iOS devices:	iPod touch (4th generation), iPod touch (3rd generation), iPhone 4S, iPhone 4, iPhone 3GS, iPad (3rd generation), iPad 2, iPad.
Operating system:	Apple iOS 5.0 or higher
Operating temperature:	+10 °C to +40 °C, 15 - 90% humidity
Storage temperature:	-20 °C to +55 °C, 15 - 90% humidity
Weight:	Approx. 213 g
Dimensions (ø x H):	Approx. 120 mm x 93.5 mm
Cuff size:	22 - 42 cm adult cuff; supports size M to L
Measuring procedure:	Oscillometric; single or MAM readings

Measurement range:	30 - 280 mmHg: blood pressure 40 - 200 beats per minute: pulse
Cuff pressure display range:	0 - 299 mmHg
Resolution:	1 mmHg
Static accuracy:	Pressure within ±3 mmHg or 2% of reading > 200 mmHg
Pulse accuracy:	± 5% of the readout value
Voltage source:	Via USB (5 V ⎓, 500 mAh) or integrated battery (3.7 V ⎓, 500 mAh)
Reference to standards:	ANSI/AAMI SP10, IEC 60601-1, IEC 60601-1-2, EN 1060 -1/-3/-4

This device complies with the requirements of the Medical Device Directive 93/42/EEC. Technical alterations reserved.

Guidance and manufacturer's declaration - electromagnetic emissions

The BP4GAPO-2M is intended for use in the electromagnetic environment specified below. The customer or the user of the BP4GAPO-2M should assure that it is used in such an environment.

Emission test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The **BP4GAPO-2M** uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Group B	The **BP4GAPO-2M** is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that suppies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	

Guidance and manufacturer's declaration - electromagnetic immunity

The BP4GAPO-2M is intended for use in the electromagnetic environment specified below. The customer or the user of the BP4GAPO-2M should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
Electrostatic discharge (ESD)	+ 6 kV contact + 8 kV air	+ 6 kV contact + 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %
Electrical fast transient/burst IEC 61000-4-4	+ 2kV for power supply lines + 1kV for input/output lines	Not applicable Not applicable	Mains power quality should be that of a typical commerical or hospital environment
Surge IEC 61000-4-5	+ 1kV line(s) to line(s) + 2kV line(s) to earth	Not applicable Not applicable	Mains power quality should be that of a typical commerical or hospital environment
Voltage Dips, short interruption and voltage variations on power supply input lines IEC 61000-4-11	<5% UT (>95% dip in UT) for 0,5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 s	Not applicable Not applicable Not applicable Not applicable	Mains power quality should be that of a typical commerical or hospital environment. If the user of the BP4GAPO-2M requires continued operation during power mains interruptions, it is recommended that the BP4GAPO-2M be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	The BP4GAPO-2M power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: UT is the a.c. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration - electromagnetic immunity

The BP4GAPO-2M is intended for use in the electromagnetic environment specified below. The customer or the user of the BP4GAPO-2M should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 KHz to 80 MHz	Not applicable	Portable and mobile RF communications equipment should be used no closer to any part of the BP4GAPO-2M including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Radiated RF IEC 61000-4-3	3 V/m 80MHz to 2,5 GHz	3 V/m	Recommended separation distance: $d = 1,2\sqrt{P}$ $d = 1,2\sqrt{P}$ 80MHz to 800 MHz $d = 2,3\sqrt{P}$ 800MHz to 2,5 GHz Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m) Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol:

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broad-cast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the BP4GAPO-2M is used exceeds the applicable RF compliance level above, the BP4GAPO-2M should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the BP4GAPO-2M.

[b] Over the frequency range 150 kHz to 80 MHz, field strenghts should be less than 3 V/m.

Recommended separation distance between portable and mobile RF communication equipment and the BP4GAPO-2M

The BP4GAPO-2M is intended for use in a electromagnetic environment in which radiated RF disturbance are controlled. The customer or the user of the BP4GAPO-2M can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the BP4GAPO-2M as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter m**		
	150 kHz to 80 MHz $d = 1,2\sqrt{P}$	**80 MHz to 800 MHz** $d = 1,2\sqrt{P}$	**800 MHz to 2,5 GHz** $d = 2,3\sqrt{P}$
0,01	N/A	0,12	0,23
0,1	N/A	0,38	0,73
1	N/A	1,2	2,3
10	N/A	3,8	7,3
100	N/A	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, wher P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Guarantee Card

Name of Purchaser

Serial Number

Date of Purchase

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Designed for use with iPhone, iPad, or iPod touch.